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THE WILSON BULLETIN

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THE SANDHILL CRANE IN A MICHIGAN MARSH

BY LAWRENCE H. WALKINSHAW

In a great marsh, the "Big Marsh", as the farmers call it, in Calhoun County, Michigan, I remember boyhood days when I penetrated its heart searching for marsh birds, regardless of warnings from my father concerning the large number of rattlesnakes to be found there. Only once do I recall observing the Sandhill Crane. That was in September, 1921, when three of these birds were seen, slowly flying, high overhead, as we worked near its edge. Even then I questioned the authenticity of the man's word because so many farmers, and others, give this name to any large, long-legged bird which might be seen.

Nine years passed, when once again I roamed the heart of the same marsh, searching for large white herons which were so abundant in the larger marshes that summer. The search was so uneventful that I was about to return when a loud honking, wild to its very depth, resembling a wild goose note, sounded from behind a small peninsula in front of me. It required only a short time to reach the opposite side of that peninsula where I looked closely over the marsh to see and hear nothing more. After a few minutes of waiting the same wild honking, seemingly a part of the great marsh, sounded closer and in only a short time three large birds, with necks outstretched flew slowly down the marsh, from where their voices carried back through the stillness of the August afternoon. At last I had found the Sandhill Crane (*Grus canadensis tabida*).

To the south a rolling field stretched back away from the marsh, forming a natural observation point for the greater part of the clearings. Here I returned with friends and on two different occasions observed not three, but eight and six birds respectively. This was much more than I had ever expected, and I determined to return and search the area for a nest the following spring.

May 3, 1931, found me in search of cranes. The water was below normal for this time of the year but the wading was hard, and

time and time again I nearly went in over my hip boots, but at last I reached the tamaracks of the opposite side. Here I rested for a few minutes then climbed a small tamarack to gaze across on a cultivated field on the other side only about a quarter of a mile distant, so I elected to again cross the largest marshy area, the one which I had just crossed. The sun swung low over the trees as I neared the starting shore, tired and discouraged for not a crane had appeared. But surprises are always in store for one interested in birds and when I had nearly reached the small peninsulas of bushes extending from the shore two Sandhill Cranes rose within a few rods of me and, flying in the late afternoon sunshine, circled to the east then flew down the marsh in a few minutes, the distance which I had covered in half an hour. The brown of their plumage was noted as they flew, due to the extraordinarily good light from my position. The rolling call resounded from the north, then, as if the birds had been talking, one arose and returned toward where I stood motionless since they had flushed, and instead of climbing higher into the air she dropped to the ground only a few rods in front of me, where I was amazed to see that large bird droop her wings and with a quivering motion try to distract my attention from the area where she had first flushed. The day had progressed so far that I decided to return later and verify the location a little better. On May 5, with two scouts, I returned early in the morning and had just cleared the bushy shore when a single crane arose and, calling loudly, flew down the marsh. I walked right to the nest, a large mound of sedge which contained two large drab-colored eggs, spotted and streaked with long splotches of brown, lavender, and darker buff. The nest, about three feet in diameter, built among the sedge and cattails, was about six inches above the water, which was only a few inches deep. I remained only long enough to examine the structure without touching it or its contents, but did observe at the end of the marsh three cranes nervously clamoring for my hurried departure.

I visited the nest with Dr. Miles D. Pirnie on May 10. We thought particularly of photography and spent just a few minutes in the beginning of a blind of willow boughs in a favorable location to the southeast. After another week had passed I returned to continue the blind only to find that the cranes were gone. There had been quite a little rain during the previous week and the nest was rather wet-appearing and deserted, so I tried the eggs for incubation heat, finding them cold and wet. We hated to leave the eggs for crows and wondered if it were possible for the old birds to return, but search

FIG. 4. Nest and Eggs of the Sandhill Crane in Calhoun County, Michigan, May 10. 1931. The photograph by Dr. Miles D. Pirnie.

as we would no signs of the cranes could be found, so we returned on the following day and took the eggs. These were turned over to the University of Michigan Museum. They measured 94.5x60.75 and 93.5x61.5 mm. The former was of an oval shape while the latter was more elliptical. The embryos had been nearly ready to hatch but were dead. I managed to remove them and they are now in the Battle Creek Public School Museum.

Discouraged over the outcome, I searched for the birds on May 24 and was elated to see two birds nearer the heart of the marsh rise from the reeds and clamor at my appearance with their loud rolling calls, but I did not wish to disturb them, and left them to their belated nesting. August trips in 1931 failed to locate any cranes. However, I was much surprised to find on the shore of a small tamarack bordered lake in Barry County, on September 27, two gray-colored cranes which raised their heads and uttered that loud ringing call. We retreated and left them to the solitude of the little lake suspecting that they were migrating birds.

The winter passed and on April 3 I drove to the "Big Marsh" where I flushed two cranes far out on the swamp before I had barely left the bordering bushes. I counted the days and planned to return on May 1. The marsh appeared deserted as far as cranes were concerned, for I tramped and tramped across the clearings with no results. Fearing the birds had stopped only in migration, I began another round about the marsh. This time a crane glided over the tamaracks and alighted far ahead where he again rose as I approached, leading me on and on.

The day had progressed and I was tired so I retraced my steps, watching a Red-tailed Hawk circle high overhead as I passed his nest in a tamarack tree near where the crane had first appeared. A week passed, then, once again I drove early to the Big Marsh and was surprised to have a Wilson's Snipe fly from a nest of four eggs right at the border of the swamp. I crossed the clearing and was elated to see the single crane almost immediately, trying again to lead me down the marsh. Marsh wrens chattered near at hand and Swamp Sparrows scolded at my intrusion. Across the creek dull booming noises sounded and I knew that the Prairie Chickens were performing not far away. In my search I approached the creek and glancing to the dry grassy area which extended beyond for another mile, observed eleven males strutting and booming only a short distance away; but I must not be distracted so returned to almost immediately flush a crane where I thought I had already walked. Again I gazed at a flat

FIG. 5. The Second Nest of the Sandhill Crane in Calhoun County, May 8, 1932.

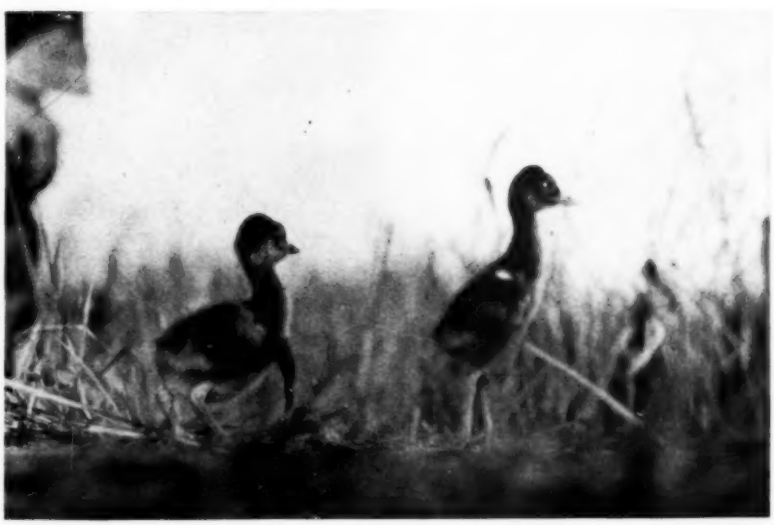

FIG. 6. Young Sandhill Cranes. One yet so weak he can hardly stand, the other much stronger. May 15, 1932.

platform of sedge with its two buff-colored eggs and again I hurriedly departed leaving things undisturbed.

E. M. Brigham, Jr., Mrs. Walkinshaw, and I returned the following week with a small blind, cameras, tripods, and other paraphernalia. We left the blind at the edge, and I showed them the nest, empty, with only a few traces of egg-shells. The little ones had hatched as we could tell by the clamoring of two old cranes about an eighth of a mile distant. But, as we stood watching them, a "*peep*" attracted our attention and we located one of the little fellows, a brown ball on two stilt-like legs, several feet from the nest. Later the other was located and we succeeded in getting photographs of the younger birds. Although I was covered and hidden near the nest in a hastily constructed blind for three hours, the old birds would not return so I righted things as much as possible and we left the area wondering what the world would hold in store for the little Sandhill Cranes which came in contact with man so early in life.

In 1933 we visited the region several times. The cranes were not there on March 12, but on the 26th the two birds circled high overhead, then returned to the place from which they rose. On April 16 only one bird could be located indicating that the other bird must be on a nest. The nest was located almost immediately when we arrived on April 30.

This nest, like the previous two, contained two ovate-shaped eggs, but was built in shorter sedge and reeds. The region was much dryer, there being very little water about. It was the type of locality where the Short-billed rather than the Long-billed Marsh Wren was found. Only a short distance from the nest we flushed a Yellow Rail and later picked it up from the reeds where it had hidden. On May 14 the nest still contained two eggs but on the 21st contained the remains of one unfertile egg, crows having probably accounted for the large hole in one side. The cranes uttering their loud rolling call flew about me as I left the marsh. The following morning friends called and wished to see the cranes if possible, so I arranged to accompany them and we had soon flushed the adults some little distance from the nest-site. Here a peep attracted our attention and the rich brown youngster was soon located. He was as pleased as we, cuddling down in one's hand to absorb the heat. After a short investigation we retreated, leaving the single little offspring with parents circling overhead. As we left I wondered what other secrets would later be unfolded in this Big Marsh, where the crane's rolling call, the Prairie Chicken's boom, even

the drumming of the grouse can be heard, where few men penetrate during the summer months and where Nature holds her own.

SUMMARY: The nests were large mounds of sedge from two and one-half feet to three feet in diameter and from six to twelve inches in depth. All three nests had standing water about them, but were located at various distances from the edge of the tamarack peninsulas; one was only a few rods while the farthest was five or six times as far. One nest was located among cattails and the large-leafed sedge, while the second was a little nearer the small leafed sedge with cattails nowhere about. The third was nearer the dryer marshy meadow, there being royal ferns, golden-rod, and small willow saplings scattered throughout the area.

FIG. 7. The "Big Marsh" in Calhoun County, Michigan, where the Sandhill Cranes nested. May 17, 1931.

The eggs were two in each case. They were brownish drab in color with markings of darker gray or brown splotched and scrawled over the whole surface, but often thicker about the larger end. The eggs were variations of the ovoid shape and the three which were taken measured 94.5x60.75 mm., 93.5x61.5 mm., and 94.5x60.00 mm. The other eggs were untouched.

The young are covered with a golden brown down when first hatched, deepest on the back of the head and neck along the back and on the wings. They were able to cover some distance from the nest where they were very hard to see if they remained motionless. The entire head was covered with down and this lasted for at least two months. The primaries, secondaries, and coverts of the wings were

well advanced at two months of age. The bill increased in length remarkably during this period as did the length of the legs. They were slaty colored during this entire period. Their call was a quavering peep having an indication of dragging it out in a faint r-r-r-r accent.

The adult birds at all three nests were very brown on the back of the neck, back, and wings, in fact I would say it was the predominant color. One bird was a little larger than the other. The birds observed in Barry County in September, 1931, were entirely gray, much different from the Calhoun County birds during the nesting season.

Migrations. March 27, 1932, and March 26, 1933. September 27, 1931. A farmer who lives near the marsh said that two of the cranes were seen in his cornfield during the mild winter of 1930-31. I can not verify this myself but do know that the man knows the birds.

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BATTLE CREEK, MICH.

DIURNAL ACTIVITY OF THE WOODCOCK

BY MARCIA B. CLAY

Over a large section of country in August, 1925, drought was prevalent. In Trumbull County, Ohio, rainfall during that month was only .75 inches, whereas the average rainfall for thirty years amounted to 3.34 inches. My lawn on the slope of the ravine at North Bristol was bone dry, but at the foot of the slope a spring-fed brook still contained water, and though the swampy floor of the ravine showed unmistakable signs of the drought there was still a considerable boggy area.

On August second I flushed a Woodcock (*Philohela minor*) on the slope from under a clump of evergreens in a patch of brambles. It tumbled into the ravine behind a mass of swamp rose. A few days later from almost the same spot I saw a Woodcock fly from an open boggy track leading across the ravine where I am sure it was feeding. The bird disappeared behind a bend of the hill and when I came up it flushed, and again tumbled into good alder cover in the edge of the swamp.

Thereafter I began to watch for this bird, and on August 15 I saw it sitting across the ravine from my yard, under some overhanging

trees on the bank of the brook at the foot of a steep hill. As I watched the motionless bird sitting plainly in view, unscreened by any vegetation, a chipmunk suddenly ran along a low pendant branch of an overhanging tree and jumped to the ground a few feet from the bird. The latter, startled, jumped swiftly into the air. My eye lost it for a moment, but almost immediately discovered it again a few feet farther along the bank. Instead of dozing again the Woodcock suddenly fluffed out its feathers until it seemed twice its former size, and thus broad, squat and grotesque, it began a teetering, undulating movement as it probed with its long bill, moving slowly along the boggy run and into the swamp. The ground was soft, and the Woodcock ran its long bill deeply into the mire, though not to the base, and that it was abundantly rewarded was evident from the frequency with which it gave its head a quick shake, as though working some morsel back towards the throat. The thrusts of the bill into the bog were not rapid, but were made with a steady rhythm that reminded me of the action of an old-fashioned hand cornplanter in the hands of a skillful farmer.

Occasionally too, the bird fanned out and flirted its short tail. In fact the bog-bird's whole body was decidedly animated, as it worked slowly into the swamp, and toward me. Occasionally the probing ceased for a few minutes while the Woodcock either stood perfectly still, or preened its breast feathers with its long bill after the manner of a duck.

The day was very clear and warm, and the ravine was flooded with sunshine. A large herd of cows had recently eaten or trampled the vegetation made scanty by drought, so there was no difficulty in observing the Woodcock. After watching the bird for a long time, I went down the slope determined to flush it. Advancing into the swamp a few feet until I was within twenty-five feet of the now quiet bird, I threw some sticks at it as it stood regarding me. Not until the third stick went hurtling over did the Woodcock budge, when it ran very swiftly across the brook and up the bank where it stood stock-still with its back to me, and without a vestige of vegetation to screen it, protected only by a few fallen leaves lying around. Again it had shrunk amazingly in size, by flattening the feathers tightly against the body.

It remained thus ten minutes perhaps, until I moved away up the slope, when very, very slowly the bird edged toward a small weed. Having gained this small shelter, it began probing again along the brookside. It was a commonplace looking bird as it froze on the

bank, but when feeding with feathers fluffed out, with wide back and waddling gait, it became grotesque, admirable chiefly for its untiring industry and a certain furtive alertness. During the next two or three hours, the Woodcock worked up the ravine about seventy-five feet to a tiny mud flat just below a spring, and here in the open, with the sun beating down it continued to probe.

At 5:30 P. M. I went down the slope again. The bog-bird stopped probing and stood perfectly still for a few minutes while we eyed each other at a distance of perhaps twenty feet. Suddenly it dawned upon me that the bird was moving. I could scarcely see it move, but its relative position was changing, as, with an almost imperceptible easing away it was nearing a clump of coarse grass and sweet flag. Even as I gazed entranced the bog-bird suddenly darted out of sight.

At 7:30 P. M. when next I looked for the Woodcock, it was feeding again on the little mud flat, and continued there probing until darkness drew a curtain between us. As twilight deepened, however, the thrusts became more rapid. At eight o'clock the next morning, the bird was feeding just where darkness had found it the night before. I could not watch it much that day, but saw it probing at noon under a blazing sun.

On August 17, the Woodcock was probing in the same locality from 11:00 A. M. till noon. At 1:30 P. M. seeing the bird sitting in an open place near a tuft of grass, I went down the slope determined to flush it. Stopping near the spring and only fifteen feet from the Woodcock, I watched it for a time. It sat perfectly still returning my gaze until I lowered my glasses and took another step forward, when it rose instantly and flew swiftly on whistling wings directly away on a line a little higher than my head, and dropped in the shelter of an overhanging bank.

August 22 my record says: Saw Woodcock feeding at noon and again at 2:30 P. M.

August 23 at 8:00 A. M. the bog-bird was still probing just below my house in the swamp. A very heavy dew of the previous night covered the vegetation like rain. The bird, too, was wet, and frequently shook its wings and tail to dislodge the water. Finally stopping on a sunny hummock, it preened its feathers with its long bill, parting the feathers of its breast and sides, and stroking and shaking the wings. Completing the toilet, it began again to probe, working along for several rods to its favorite location near the spring. Here the bird spent the entire morning ceaselessly probing. At one time a horse pasturing in the lot came directly across the bird's feeding

ground, but the Woodcock simply ran nimbly a few feet to one side until the disturber had passed, and then returned to its old grounds. It reacted similarly when two or three chickens came along.

On August 26, at noon, the bog-bird made its last appearance below the spring. I did not follow its movements except to note that its fondness for food was undiminished.

The summer of 1926 found vegetation and swampy areas in the ravine normal. July 20, 1926, was a hot day, 90° with a blazing sun. While watching a pair of Killdeers running along the brook, my eye was drawn to a bird directly opposite me sitting on the bank of the brook preening itself. Noting its cinnamon breast, I at first took it for a Robin, but a second look disclosed the long bill of a Woodcock. It soon began to move along the brook picking from the top of the ground and occasionally probing slightly. The bird upon observing me began to sidle along toward some weeds, and having gained this desired shelter it enconced itself in the cool shade partially concealed from sight. Returning in an hour I saw the bird moving slowly along probing in a desultory and not very ambitious manner.

July 21. Blazing sun again. Second hottest day known to the Weather Bureau. At 9 A. M. the Woodcock was sitting at the brookside under some trees. It soon began to probe, but upon discovering me it moved up along the bank toward better cover at the mouth of the ravine. The slope to be traversed was steep, sandy, bare, and in a blazing sun. With head erect, and body rocking back and forth, the bird advanced one foot as far ahead as possible, as though feeling its way in the dark, then after two or three more teeterings it shifted its weight to the foot in advance. Then very, very slowly and carefully the other foot reached forward, and the movement was repeated, while all the time the bird's eye was centered on me. Patiently and stealthily this snail-like pace persisted until the Woodcock had traveled two or three rods, and to within a few feet of the desired cover, when suddenly it darted nimbly out of sight. However, at 1 P. M. this bird was back in the ravine again, sitting under the bank in the shade of its favorite trees.

July 31, at 9 A. M. Woodcock in same place and went through the same performance traversing the washbank, except at the end it flew noiselessly to cover.

August 7, at 7:30 A. M. Bog-bird under the bank in ravine, poking along, probing now lightly, now deeply. Tapped the earth once with its foot. At 8:30, I left it on the bank preening.

August 9, I saw the bog-bird flapping its wings in the open bog at 8 A. M. It fed around until 9:30 A. M. but I did not see it go.

August 12, at 6 P. M. Woodcock feeding in open swamp. At 7 P. M. I went down to within a few feet of it, when it whistled away to the old spring where I found the bird sitting in the open upon some leaves, but it whistled away again along the slope to my yard where I flushed it half an hour later, and again it whistled across the ravine to the old haunts under the bank.

August 19. Bog-bird preening on the bank at 5 P. M. facing me. It soon worked off into the weeds along the brook, teetering and probing.

August 20, at noon the Woodcock was undulating slowly along the brook across the bog to the other bank, probing but evidently not finding much. Finally it came to rest near the hill. At 3 P. M., I stood looking down at the bog, but could not see the bird until it suddenly rose and flew silently straight away to the slope across from me. It lit on a washbank where it sat a while and then meandered down hill under tthe trees, and was lost in the weeds along the brook. At 4 P. M. the bird appeared again in the open bog, having come back. It probed energetically during all the remainder of daylight, with short spells of resting.

September 1. Under a bright sun, a Woodcock probed diligently at noon. As I watched, the bird raised its wings straight up and flapped, then slowly closed them and shook its tail. It worked for about two hours. This being the last appearance for the season.

This bird was smaller than the one of the previous year, and not nearly so energetic. Owing to more rainfall the swamp had much better cover, but the smaller Woodcock was much more timid than the other. I am strongly of the opinion that I saw only one bird each year.

In July, 1927, following a torrid week which left the uplands dry, I secured four records of a Woodcock feeding in this same ravine in mid-day under a blazing sun. The dates were July 10, 12, 17, and 21. This bird resembled in size and manner the bird of 1925. It was large and energetic and gave ample proof of an abounding industry during the day.

North Bristol, Ohio, via Bristolville.

THE PRESENT STATUS OF BREWER'S BLACKBIRD IN THE SOUTHEAST

BY THOMAS D. BURLEIGH

On November 25, 1930, while crossing an open field in the wide fertile valley of the Mills River, near Asheville, North Carolina, I saw a large blackbird feeding near me that I first thought was a grackle. Something about its appearance, however, aroused my curiosity. There was no apparent reason why its identity should puzzle me, yet I felt instinctively that something about it differed from the blackbirds with which I was familiar. So I collected it and found that it was a male Brewer's Blackbird (*Euphagus cyanocephalus*). Subsequent search that evening of what literature was available dealing with the birds of North Carolina revealed the fact that there was no other record for this species in the State. Accordingly I considered it merely one of those accidental occurrences that at one time or another can involve almost any species and, while gratified at having added the bird to the North Carolina list, attached no other importance to this unexpected record.

The following spring, on April 6, 1931, while I was driving by a large pasture midway between Swannanoa and the town of Black Mountain, and approximately twelve miles east of Asheville, two blackbirds that were feeding a little apart from a flock of Red-winged Blackbirds in the same field attracted my attention. Looking at them through my binoculars I saw at once that they were Brewer's Blackbirds, a male and a female. On my approach they flew into the top of a near-by tree, where the male uttered notes suggesting those of the grackle and quite unlike those of the Rusty Blackbird (*Euphagus carolinus*), which the Brewer's Blackbird more closely resembles. That there might be no question of my identification, the male was collected and this species definitely recorded for the State for the second time.

With the additional occurrence of this western bird in western North Carolina I now wondered if it might not prove to be a regular migrant there, overlooked in past years by other observers. On this supposition I devoted considerable time that fall (1931) to a more or less thorough search of all spots suitable for this species, and by early December was convinced that my suspicions were well justified.

The first birds, a flock of ten in which both sexes were in equal numbers, were seen on November 16, and during the following three weeks other flocks of varying sizes were noted almost daily. At times

individual birds were found feeding alone, but usually four to eight birds comprised the flocks that were seen, and it was not uncommon to find as many as fifteen or twenty individuals together. They were seemingly rather exacting in their requirements, showing a decided preference for open fields and pastures but almost invariably remaining close to barns and farm houses. While such conditions attracted other blackbirds, Brewer's Blackbirds rarely associated with them, feeding a little apart and appearing entirely satisfied with their own company. In common with the Cowbirds they seemed to prefer the vicinity of cattle or horses and were frequently found in such situations. On December 8, 1931, four birds, all males, were seen at the edge of an old apple orchard in the open Mills River valley. These were the last of this species noted that fall.

As spring approached I again made the occurrence of these birds in this region one of my special objectives, and I found them as plentiful as they had been the preceding fall. A single bird, a female, appeared on February 25, 1932; within a week small flocks were observed almost daily, and as late as April 12 two birds, a male and a female, were seen feeding about cows in a pasture.

In the fall of 1932 the first birds, a male and two females, were seen on November 14 in a field near Swannanoa, and soon afterwards small flocks were of common occurrence. Early in December the bulk of this species had gone; but a few individuals were noted at irregular intervals during the month, and as late as December 26 two males were seen feeding at the edge of a stream in a marshy field.

As it gradually became evident that Brewer's Blackbird actually was not only a regular but a common migrant in the mountains of western North Carolina, I became curious as to the whereabouts of this species during the winter months. The fourth edition of the A. O. U. Check-List gives the winter range as "southern British Columbia and Wisconsin and Kansas south to Guatemala. Casual in Illinois, Missouri, Louisiana, Southern Florida and South Carolina." Inquiry revealed the fact that there were no definite records for Florida, and that the inclusion of that State in the range of this species was open to question. For South Carolina there are three published records. Leverett M. Loomis first recorded this western bird in the State after collecting five specimens from a flock of a dozen found at Chester, on December 9 and 10, 1886 (*Auk*, Vol. IV, p. 76, 1887). Forty years later Prof. Franklin Sherman and George E. Hudson found this species at Clemson College, collecting a male on April 17, 1926, and a male and a female from a flock of twenty on December 18, 1926 (*Auk*, Vol.

XLIV, p. 567, 1927). Even these few records indicate that Brewer's Blackbirds passed through at least the Piedmont region of South Carolina in past migrations, and it seemed rather surprising that they were not observed oftener or were not recorded at all south of Chester or Clemson College. As the birds had appeared with such regularity and in such relatively large numbers each spring and fall for the past three years about Asheville, I could not help but feel that unquestionably they wintered regularly somewhere in Georgia or Florida. That this assumption was warranted, at least in part, seemed evident on a short field trip I made to Augusta, Georgia, the latter part of November, 1932. While I have no way of knowing whether I was too early or too late to observe the majority of these birds in Georgia, I experienced little difficulty in locating a flock of ten that were feeding, on the morning of November 30, in an open pasture a few miles north of Augusta. A female collected that day is the first definite record for the occurrence of this species in the State.

While it is true that the present status of Brewer's Blackbird south of Augusta is still a matter of conjecture, it would seem now that the birds have been overlooked. To one familiar with the bird this may appear rather surprising, for despite its general resemblance to both the Grackle (*Quiscalus quiscula*) and the Rusty Blackbird, its notes are quite distinctive and its appearance in the field almost equally so on close scrutiny. However, when one remembers the vast hordes of blackbirds that winter in southern Georgia and Florida, the ease with which a species associating with these immense flocks could escape observation is more readily apparent. It is well known that in recent years Brewer's Blackbird has been extending its breeding range eastward, and this may account in some degree for its present abundance in western North Carolina. That it actually winters in fairly large numbers south of these mountain valleys seems now to be an established fact, and it will be interesting for bird students to determine in future years just where these birds go, and to attempt to answer the question of why they have heretofore so completely escaped observation.

U. S. Bureau of Biological Survey,
Asheville, N. C.

NOTES ON THE FAMILY LIFE OF A PAIR OF AMERICAN PIPITS

BY HAZEL S. JOHNSON

Among the many species of birds recorded in migration throughout the eastern states, the American Pipit (*Anthus spinoletta rubescens*) is fairly common. Due, however, to the northern latitude of its nesting range much is yet to be learned concerning its breeding habits. While spending the summer of 1931 at Wolf Bay on the Labrador coast—a station near Cape Whittle, I made the following observations on the family life of a nesting pair of this species. These notes cover a period of five weeks but refer particularly to the time that the young were in the nest.

The nest was located on a southern slope somewhat protected from the weather by an overhanging mat of Crowberry vines which formed the ground cover.

Pipped eggs were noted on the evening of July 1. By the evening of the 2nd all six eggs had hatched. A blind was placed four feet from the nest, thus enabling me to make close observations even during dense fogs. The birds readily accepted the blind, showing no concern over wind movements of the canvas. Observations were made at various hours on different days to secure notes on the activities of the birds from early morning until they went to sleep at night.

While in the nest the young were fed at quite regular intervals throughout the long July days (see table). My notes show that they were fed as early as 4:30 A. M., (I believe that feeding started even earlier) and continued as late as 8:55 P. M. Rain and fog did not seem to retard feeding activities of the parent birds.

Sex differentiation between the old birds was at first undiscernible. But after studying the two close together it was evident that the coloring of one was a bit darker and that the fuscous splotches about the throat formed a more definite pattern. This darker bird did all the hovering according to my observations. It was presumed to be the female and is so designated in my notes. When the female went on the nest her manner of spreading the breast feathers indicated that the belly was bare (this condition was noted in a specimen collected).

Sometimes as I approached the nesting site I would be challenged by a Savannah Sparrow at a distance of a hundred yards. If this bird followed me with any insistence, the male Pipit would appear and with agitated chirpings would follow me to the blind. After the third day this action did not cause the female to leave the nest.

During the two weeks of the brooding period the growth of the young seemed uniform. No difference in size or plumage development

was apparent. On July 4 one young bird was found outside the nest, pushed out perhaps as the female left hurriedly. Although cold and seemingly lifeless when found, it was replaced in the nest. It recovered and grew normally. The female would frequently adjust the young in the nest by scooping under them with the beak. Brooding was frequently interrupted for this performance until the young were strong enough to compete for nest space themselves. On July 6 pin feathers were through the skin. By the 11th they were out of the sheaths. The birds now seemed crowded in the nest. They were last

FIG. 8. Male Pipit leaving its nest. Wolf Bay County, Quebec.

seen in the nest in the late afternoon of the 15th. That evening they were out of the nest but nearby. Next morning a hawk was shot near the nest site and was reported to have been attacking young birds. This may account for the fact that but three of the brood were seen on the 17th, with the two parent birds.

Between July 16 and August 3 the family of three young with one or both parents was often seen about the woodpile and house of a local family about 300 yards from the nest site. Another family of Pipits was frequently seen in this same territory but there was no apparent intermingling of the two broods (the brood under study was identified by bands). During the first two weeks out of the nest the young birds seemed to make little effort to find food for themselves

but waited until the parent birds brought food and placed it in their mouths. Sometimes the old birds would utter a twittering chirp when food was found, whereupon one or more young would go to the parent to receive it.

Some change was noticeable in the actions of the old birds while the young were in the nest. During the first week the brood was aroused by a low gurgling chirp from the parent bird as it approached the nest with food. By the eighth day it was obvious that the young recognized the old birds or were aroused by their wing vibrations. As the female spent the greater part of her time on the nest, the male brought most of the food during the first six days. Flies and small larvae were the main diet. One large larva or from two to four smaller ones were brought at one time so that each trip represented a fairly constant quantity of food.

It was noted that late in the evening the female seemed reluctant to rise and allow the male to feed. He would thrust his beak full of food first on one side then the other of her head and neck before she would stand up.

The female often examined food brought by the male with her beak before it was given to the young. Sometimes one parent did all the feeding but more often the food was divided and both fed, placing all of it in the mouth of one young bird then removing bits which they gave to others. Very rarely did the female eat any of the food brought by her mate.

After feeding both birds would look expectantly at the nest. When a mass of excreta appeared it was promptly seized and consumed or carried away. In most cases the female secured it but evidently there was some competition between the parents for this privilege. During the last few days of the nesting period excreta were carried off and the nature of its disposal is unknown. Examination showed that it was enclosed in a membranous sac.

My notes record a few instances of the female leaving the nest apparently in answer to the call of her mate. Presently one or both birds returned with food. Once I saw her fly to him and both appeared to join in a struggle to extricate something from the lichens. Then both came to the nest, the male carrying an unusually large grub, which he fed to the young. Later in the brooding period the female would sometimes search for food a few yards from the nest. If the male approached her she would dart at him as though hostile.

As I could not see from the blind farther than a few yards about the nest, it was impossible to tell whether or not the male Pipit spent

DATA ON THE BROODING ACTIVITIES OF A PAIR OF PIPITS

Date	Hours of Observation	Total	No. of Feedings	Avg. Time Between Feedings	Weather	No. of Absences	Total Time Off Nest	Percentages Time in Blind
July 3	1:15-2:30 P. M. 2:55-4:00 P. M. 7:23-9:00 P. M.	3 hrs. 53 min.	21	8¾ min.	Heavy fog. Fair Light	4	42 min.	17.59
July 4	9:00-10:20 A. M.	1 hr. 20 min.	9	6½ min.	High wind followed by fog	2	27 min.	33.75
July 6	6:45-8:50 P. M.	2 hrs. 5 min.	19	6½ min.	Rain Wind	5	17 min.	13.60
July 7	8:10-10:06 A. M.	56 min	11	11 min.	Fog	1	At least 1 hr. 56 min.	100
July 8	11:02-12:05 A. M.	1 hr. 3 min.	11	5 min.	Rain Wind	2	23 min.	36.34
July 9	4:15-6:15 P. M.	2 hrs.	5	19 min.	Rain Heavy fog	1	At least 2 hrs.	100
July 11	8:20-10:30 A. M.	2 hrs. 10 min.	6	10⅔ min.	Fog Clear	1	At least 2 hrs. 10 min.	100

his time near the nest. He would utter a chirp as he approached the nest with food and a sort of excited twitter from the field at which the female would usually fly in his direction but I never heard him sing from the air.

The accompanying table shows the brooding routine during periods of observation. While the percentages of time spent off the nest can not be considered as satisfactorily indicating the intensity of brooding, they are nevertheless interesting in that connection. Due to the short periods of time spent in the blind and the various times of day at which data were recorded these percentages can be considered only in that they suggest a general trend.

ONEONTA, NEW YORK.

INFLUENCE OF THE GREAT LAKES ON THE MIGRATION OF BIRDS

BY RALPH BEEBE

The above topic was first brought to my attention when, as a very young boy in my farm home in Schoolcraft County, I observed in autumn the great numbers of hawks which passed along in their autumnal migration. So great was the concentration that the earth was appreciably darkened at times as the hordes passed over. Many were Cooper's Hawks but there were also Red-tailed, Red-shouldered, Broad-winged, and many too high up to identify. After the flight came the Goshawk, which sometimes lingered all winter.

Our farm was located in the hardwood belt, which extended back from Lake Michigan for a considerable distance, except for a belt of pine barrens about two miles wide along the shore and coming to within a half mile of our farm.

Subsequently, from about 1909 to 1916, observations were conducted near Newberry, Luce County, about midway between Lake Michigan and Lake Superior. The country there is mostly cut over land, there is some virgin timber remaining and there are farms of considerable area. The land is sandy except the swamps, rolling in contour, the hills of glacial origin as attested by the soil strata observed when an excavation is made. Solitary boulders, some as large as a small house, testify to the moving abilities of the ice in former ages. There were occasional small lakes, dug out by the shifting ice. Here I was privileged to make some careful observations, some of the results of which I will endeavor to relate. They are by no means complete but may suggest a line for future investigations.

The hawks first mentioned were the most conspicuous and easiest observed on account of their size and diurnal habit. The Cooper's Hawk is a breeding bird but immense numbers formerly migrated in autumn along the shore of Lake Michigan, keeping within the timber belt and avoiding the open pine barrens. The Red-tailed, Red-shouldered, and Broad-winged Hawks kept high in the air and did not tarry along the way as the Cooper's Hawk sometimes did, to the detriment of our poultry yard. The Sparrow Hawk invariably laid his course through the fields and pine barrens, avoiding the heavy forest. Duck Hawks were sometimes seen and they are known to nest along the Pictured Rocks on Lake Superior.

All these raptorial birds migrated in a westerly direction in the autumn and in an easterly direction in the spring. The autumnal migration was much larger. Many of the birds passing through in

autumn came from the interior of Canada. At Whitefish Point on Lake Superior the State maintains a hawk hunter, who posts himself there and shoots the injurious species as they appear. The route then lies along the northerly shore of Lake Michigan into Wisconsin instead of across the Straits of Mackinac. The Straits are only about ten miles wide and there are islands for resting places between, yet apparently few hawks cross there. In spring the route is reversed.

In September and October the traveler along the north shore of Lake Michigan will see little parties of Sanderlings, bobbing along

the wave line, occasionally taking wing but always proceeding westward. In spring the return journey is made. At East Tawas on the west shore of Lake Huron from September 26 to October 7, 1930, none were observed, although they were migrating along the north shore of Lake Michigan at the time.

The migration route from Wisconsin through the Upper Peninsula of Michigan appears to be an important one, bringing many western species into the region. Some of these may be noted. Unless otherwise noted they are sight records although made under conditions which I have never felt permitted any uncertainty of identification.

Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*). Observed in Schoolcraft County, April 9, 1904.

Western Meadowlark (*Sturnella neglecta*). At Newberry, May 14, 19, 1909; May 25, 1912; May 1, 3, 1913; April 27, 1914; and April 8, 15, 1915.

Chestnut-collared Longspur (*Calcarius ornatus*). There was a heavy flight from May 19 to 26, 1909. Many thousands were seen. Other flocks were noted May 25, 1912 (50); May 17, 1914 (4); and May 19, 1914 (30).

Western Yellow-throat (*Geothlypas trichas occidentalis*). At Newberry, May 25, 27, 1909 (3).

Mr. M. J. Magee of Sault Ste. Marie, has trapped and banded several Gambel's Sparrows. The species has also been taken in the lower peninsula. The Harris's and Clay-colored Sparrows are recorded but I have never seen them.

The Swainson's Hawk (*Buteo swainsoni*) has been taken at Hessel near the Straits of Mackinac, October 13, 1908 (Taverner, *Auk*, XXVI, 1909). It was also taken by Wood near Cheboygan across the straits, October, 1883. (*Auk*, XIV, 1897). I saw one near Newberry, September 13, 1910.

The Horned Lark (*Otocoris alpestris alpestris*) was seen in large flocks along the shore of Lake Michigan but was rare in the interior. The Prairie Horned Lark (*Otocoris alpestris praticola*) and the Lapland Longspur (*Calcarius lapponicus lapponicus*) appeared in immense flocks in spring and fall, following the usual migration route.

The Pipit (*Anthus spinoletta rubescens*) occurs abundantly in autumn and less commonly in spring. I believe that the Sprague's Pipit (*Anthus spraguei*) is also found but as yet there are no specimens to substantiate it.

The single known exception to the usual custom of migrating westward in autumn and eastward in spring appears to be in the case of the Evening Grosbeak. Visual observations and banding records of the species indicate that it migrates eastward in autumn and westward in spring. It has recently been established that it is a breeding bird in the area.

Naturally, the lakes attract many species usually marine. Some of these may be noted.

Pomarine Jaeger (*Stercorarius pomarinus*). Three were seen near Newberry on May 23, 1913, flying rapidly southward.

Purple Sandpiper (*Arquatella maritima*). At Newberry, November 25, 1909; November 7, 1910 (specimen); November 7, 1914; and October 21, 1915.

Great Black-backed Gull (*Larus marinus*). At Newberry, January 22, 1916.

†Arctic Tern (*Sterna paradisaea*). At Detroit River near Belle Isle, December 14, 1920, and at East Tawas, October 6, 7, 1930 (400).

Another phase of the migration route through Wisconsin is the fact that some species arrive in the spring before or at about the same time as they arrive in the Lower Peninssula. The Meadowlark arrives at Lansing from March 3 to March 28, average March 12. (Barrow's Mich. Bird Life, p. 444). At Newberry I have dates of arrival as follows: March 4, 1910; February 23, 1911; March 2, 1912; February 26, 1913; February 26, 1914; February 17, 1915; and March 11, 1916. Newberry is about 300 miles north of Lansing.

The Veery (Barrow's Mich. Bird Life, p. 713), enters the Lower Peninsula the first week in May or a little earlier. The earliest record at Detroit is given as April 22 and the latest May 4. At Ann Arbor, about fifty miles west, the earliest record in twenty-five years is given as April 16, 1889, and the average appearance the first week in May. At Newberry I have arrival records of April 23, 1913; April 26, 1914; April 24, 1915; and April 16, 1916. But in 1909 it was first recorded May 30, in 1910 on June 4, in 1911 on May 30, and in 1912 on May 24. It would seem improbable that such a wide variation would be due to insufficient observation as it is a common and conspicuous species. I believe that the divergent dates represent arrivals from different sources. The later dates would be consistent with a migratory movement through the Lower Peninsula, while the earlier ones are about equal to the earliest dates of arrival in the Lower Peninsula and suggest a simultaneous movement from the southwest through Wisconsin and Lower Michigan.

The Sharp-tailed Grouse (*Pedioecetes phasianellus phasianellus*) and the Thick-billed Redwing (*Agelaius phoeniceus fortis*) occur in Michigan only on Isle Royale in Lake Superior as far as known.

The Wisconsin route into the Upper Peninsula is used by forms of life other than birds. The coyote has within the past twenty years spread over the Upper Peninsula, coming in from the west and it is now invading the Lower Peninsula. Western species of insects follow the same route.

More than a hundred years ago a marauding band of Sioux Indians came in from the west. They remained for about three years, the relatively peaceable native tribes being unable to resist the fierce invaders. They finally encamped on an island in the St. Marys River. The native tribes had now gathered in force and when the invaders finally left the island the natives fell upon them and left few survivors to return to the western plains.

Detroit, Mich.

THE NESTING AND THE LIFE EQUATION OF THE WISCONSIN BOB-WHITE

BY PAUL L. ERRINGTON

The nesting of the bob-white has already been exhaustively studied in the course of Stoddard's (1931) classic work in the south. He was also concerned with the working out of a coherent life equation through a study of the various mortality factors determining population levels for the species. Ecological research on the northern bob-white has been the aim of the quail investigation (1929-'32) which was established at the University of Wisconsin by the Sporting Arms and Ammunition Manufacturers' Institute and the U. S. Biological Survey. Although in a great many respects the Georgia life history findings hold true for northern as well as for southern quail, yet the north has very much its own problems, its own factors of shifting values. The Wisconsin nest studies, then, do not represent a northern attempt to duplicate in entirety Stoddard's program, but advantage has been taken of his methods.

Cock quail the season of 1931 began calling "bob-white" about the last of March (earliest record March 26) and were calling quite frequently by mid-April. At this time the birds were loosely pairing up, but still attached to the old coveys. The flocking habit was weakening, however, and by late April the covey as a social unit had generally disintegrated. I suspect that many of the pairings were not of any degree of permanence before May 1. Eleven of the sixty-nine Wisconsin quail nests on which I have personal data were calculated to have received their first eggs between May 2 and May 10, but one of the University bird banders got an egg in a trap April 27! It may be that the nesting season of 1931 was somewhat early over Wisconsin quail country as a whole, for the quail came through the mild, almost snowless winter in splendid condition. Populations that barely squeeze through a long winter of hunger may not be ready for laying by the fore part of May.

The topographic location of nests is largely determined by the location of nesting cover available, mainly bluegrass (*Poa*, June grass). Unless pastured, burnt, or mowed off, this bluegrass occurs in the most satisfactory density and proximity to feeding grounds along roadsides and field fencerows, where twenty-five and fourteen nests were found respectively. It also occurs prominently in orchards and ornamental plantings, in which were situated ten more nests. Three nests were built in woodland bluegrass patches. Fourteen were in hay fields, one on a pastured hillside, one on a sandy knoll, and

one on the edge of an erosion gully. Thirty-two were within a few yards of cultivated fields.

Thirty-three of the sixty-nine nests were in nearly pure bluegrass stands; seventeen in bluegrass mixed with other grasses (quack grass, timothy, etc.). In midsummer almost any herbaceous vegetation, open yet affording concealment, may be utilized. Nine nests had backgrounds of alfalfa, six of timothy, one of panic grass (*Panicum*), one of mixed wild barley (*Hordeum*) and pigeon grass (*Setaria*), and two were on virtually bare ground but roofed over with mint stems (*Monarda*) in one case and with bluegrass stems in the other. The last mentioned was constructed half-way up a steep cut bank entirely from materials carried to the spot and skillfully woven to form a roof.

Fifty-two out of sixty-five were either roofed over or in vegetation sufficiently thick to provide the equivalent of roofing; eleven were partially concealed from most angles; and two had no top covering whatever. The nest openings did not face any constant direction. Eleven were exposed to the southeast; nine to the east; nine to the north; eight to the south; eight to the southwest; five to the northwest; five to the northeast; four to the west; and eight had no discernible exposure. Thiry-seven nests were in places sun-lit during most of the day; five in morning sunlight; nine in afternoon; eighteen in places briefly or diffusely illuminated, exemplified by alfalfa fields or open woodlands.

Nest sites were well chosen as to drainage, twenty-seven being adjudged excellent; twenty-eight good; ten fair; and three poor. The three poorly drained nests were located in low spots in hay fields, certainly not because of necessity, for there was abundant alternative cover.

The exact positions for eighteen nests (principally May nests) were chosen with reference to tufts of dry grass, weed stems, fallen branches, saplings, small briar canes, etc., which may serve to supplement nesting cover not too inviting early in the season. That mechanical obstruction to large moving dangers such as trampling domestic animals as well as concealment may likewise be gained is indicated by the establishment of fourteen nests under fence wires; eight at the base of posts; one under a stump; one partly under a log; and one under a low conifer.

Whether there is a definite evolutionary tendency for quail to nest more and more under fence wires and in similarly protected places, I cannot say. An inimical agency selective enough against non-conformers might ultimately modify the nesting habits of the species. An agency of this kind we might have in the mowing machine.

The prevalent practice in my observational areas is to mow both roadsides and hayfields during the last half of the main nesting season, a practice responsible for fourteen out of my thirty-five nest failures. In only one instance did a hay-field nest hatch before the hay was cut; in two instances adults remained on mowed-over nests to hatch out the young. I might observe parenthetically that a cheap and practical iron rod designed by Peterson (1931) for attachment to mowing machines has received favorable comment as a device to flush incubating Hungarian Partridges from hay-field nests, thus enabling the farmer to stop the team before the nests are destroyed.* It has not been tested on quail.

Man was closely responsible for the failure of eight other nests, viz., three desertions on account of human snoopers; two desertions presumably because of the activities of workmen near by; one nest crushed by a saddle horse (?); one by a wagon wheel; and one accidentally hoed out of a cultivated tract. A cow cropped away the covering of another nest, as a result of which something filched the eggs. Three nests were deserted from unknown causes, including one maybe through my fault.

Direct predaceous influences were detected in the destruction of five nests: three by striped ground squirrels (*Citellus tridecemlineatus*); one by a skunk (*Mephitis*); and one by a dog. Three were broken up without any perceptible clue, and another under circumstances that seemed to point to fox squirrel. The preceding losses given in this paragraph relate to live nests; most of the clutches exposed by mowing were soon rifled, especially when abandonment left the eggs in plain sight. Two mowed-over clutches were devoured in the typical slobbery canine manner; others disappeared in a way suggestive of crows.

Adult mortality during the nesting season? The incubating bird of one of the mowed-over nests was hit by the sickle, but the seriousness of the injury is not known. Several farmers have told me of having killed or injured quail while mowing. The past two summers four banded quail were known to have been killed in steel traps set for ground squirrels on one suburban property. The remains of an old bird (a kill of about three days) were found in front of a hatched-out nest; the evidence indicated housecat as strongly as anything, but it was very inconclusive. Contemporaneous studies on raptor food habits, particularly Great Horned Owls, Cooper's Hawks, Marsh

*Information on other flushing devices of later origin may be obtained from the Iowa Fish and Game Department, Des Moines, or from American Game Association, Investment Building, Washington, D. C.

Hawks, and Redtails disclosed no summer quail leakage save for a single July individual taken by a Great Horned Owl. I was unable to obtain many data on the summer food habits of mammalian predators (foxes, Mustelidae, etc.), so the question of their role as enemies of adult bob-whites at this season will have to remain open.

In one case a cock took over nesting duties some days after incubation had been started by the hen. Does this hint the demise of the hen? Altogether, three of the twenty-four incubating birds, the sex of which could be identified, were males. The other two began incubation upon completion of the clutches, a normal occurrence (Stoddard, 1931).

I am not ready to hazard an opinion as to the likelihood of the three mysteriously abandoned nests representing mortality. While my data reveal no preponderance of desertions at any time of the season, quail have been noted to exhibit no great fidelity to their nests until incubation has begun, and may be expected to desert during the laying period at practically any time that something happens of which they do not approve. As the hatching date of the eggs draws near the birds become less "touchy" about disturbances, even some (mowing) which must seem cataclysmic to them.

Clutches appear to have equally good prospects for hatching if laying is begun either previous to June 1 or delayed until the latter part of the month.

Clutches began		Hatched	Lost	Remarks
First half of May,	14	8	6	2 deserted
Last half of May,	7	4	3	2 deserted
First half of June,	13	2	11	3 deserted, 5 mowed over
Last half of June,	8	5	3	1 deserted, 2 mowed over
First half of July,	5	3	2	1 deserted, 1 mowed over
Last half of July,	3	3	0	
August,	3	2	1	

A broad statement might be made that the early clutches are the largest and that later ones decrease progressively until the approach of fall. This does not imply that a pair will raise more than one brood in a season; it is simply the manifestation of repeated attempts to bring forth young after breaking up or desertion of previous nests.

Complete clutches began		Average number of eggs
First half of May,	11	19.2
Last half of May,	6	16.6
First half of June,	9	17.0
Last half of June,	6	14.2
First half of July,	5	13.8
Last half of July,	3	11.3
August,	2	9.0

Complete data were not obtainable on the thirty-four successful nests of the sixty-nine, but of these eight hatched in June; nine in the first half of July; four in the last half of July; three in the first half of August; four in the last half of August; and two in September. The continued June and July hatching, despite the widespread mowing operations of these months, is due to the advantageous locations of the nests started before luxuriant growths of timothy and alfalfa tempted the birds away from the comparatively safe but restricted fencerow bluegrass.

Very late clutches in addition to being small may also hatch imperfectly, and the young may be hopelessly backward to meet cold weather. My latest brood had three live chicks (of ten eggs, six didn't pip and one chick died beside the nest) hatched September 24, 1930. Occasionally an observer encounters half-grown quail, or smaller, along in November, but the evidence is scant that many of them get much farther. I would judge that a quail must be hatched by September 1 in order to have a fighting chance to survive a moderately rigorous winter.

Thirty-one nests produced 420 living young or an average of 13.6 per nest. Left in these nests were forty-five, or 9.7 per cent, unhatched eggs, most of which were sterile or contained dead embryos. The usual cause of death of embryos appeared to be chilling; for example, seven out of a clutch of seventeen were killed at the point of hatching apparently by water collecting in the bottom of a nest during a heavy rain. Sometimes, too, individual eggs were noticed to be uncovered by the incubating bird. One chick was partially eaten by small animals (ants?) in an opened shell. Two young were found dead on the ground in the vicinity of the nests.

The quantitative measurement of chick mortality so far has been quite too much of a problem for me, but a few observations illustrate how heavily peril weighs upon the young in the early helpless stages. Two chicks (15 and 20 grams) became wedged and died under (not inside) the wire floor of a cage bird trap. Another was cut in two by a mower sickle. I have been told of chicks that couldn't climb out of a plowed furrow. The body of a newly hatched quail chick was retrieved from a domestic chicken in a farmyard. Stoddard mentions cats attracted by peeping of hatching young, and I have strong evidence of a striped ground squirrel bringing ruin to a nest under similar conditions. The counterpart of Stoddard's (1931 and unpublished) terrifically destructive ants I have not discovered in the North.

Let us, by the juggling of what data we have, endeavor to secure

some kind of evaluation of some factors governing bob-white populations.

The central portion of one of my observational areas at Prairie du Sac, Wisconsin, gave an accurate census of seventy-three quail at New Years, 1930. At New Years, 1931, the census was 184, an increase of 152 per cent. The central portion differed to no radical degree from the surrounding territory, either with respect to quail populations or environmental types, so it is thought that errors due to summer ingress or egress of birds should compensate for each other.

The quail of this area lost no more than 5 per cent from New Years, 1930, up to the breeding season, thus leaving sixty-nine birds as stock. A sex tally on 305 Wisconsin bob-whites, mainly random specimens and birds trapped for banding, shows but 42.3 per cent females. This ratio applied to sixty-nine birds gives twenty-nine females, and hence a maximum of twenty-nine pairs. The percentage of non-breeding females in another area (University Marsh Farm, Madison, Wis.) was computed to be 15 per cent.* If we may be permitted to transpose this percentage of non-breeding (?) females to the Prairie du Sac area, the twenty-nine pairs would be lessened by four.

If the twenty-five breedings pairs nest early in May and are so fortunate as corresponding early nesters actually studied, they will be 57 per cent successful in their initial attempts. Their 14.3 successful nests will average 19.2 eggs, of which 9.7 per cent will not hatch. This gives 248 live young and leaves 10.7 pairs to make renesting attempts.

Of the 10.7 unsuccessful pairs two-thirds or 7.1 pairs (on basis of advancement of clutches when lost) are in condition to continue their laying with but brief interruption after the breaking up of their first nests. Their chances for success will be the same as for the first and 57 per cent or four nests will succeed and 3.1 will fail. The average clutch will be 16.6 eggs minus 9.7 per cent (eggs not hatching) or sixty live young for the four pairs.

There are 6.7 pairs left, which if they raise young at all are not destined to raise an early brood. Of these, let us say, five pairs are still able to renest the first half of June. To no slight extent on ac-

*University Marsh Farm census of eighty-nine quail, March 2, 1930. A loss of three (assumed, but based on some data) up to breeding time leaves eighty-six birds. General banding records for area show 46.2 per cent females or a ratio of forty females to forty-six males. This gives an excess of six cocks. An observed July, 1930, excess of twelve whistling unmated cocks may then be indicative of six non-breeding females or fifteen per cent of the forty. Possible sources of error: unknown spring-summer reduction of hens or influx of cocks from outside.

count of mowing, only 15.4 per cent or .8 nests will succeed, and the population will be increased by twelve live young.

The six unsuccessful pairs may be rather worn out by this time but will probably try again in July or August. In this event 68.4 per cent or 4.1 nests will succeed, which high percentage will be offset by the smaller clutches and will give us only forty-eight young.

The season is now over, and, assuming no adult mortality, after a total of forty-three trials, 23.2 out of the twenty-five pairs were able to hatch out broods varying in size from four to twenty-one. The total number of chicks (248+60+12+48) equals 368, or an average of 14.7 young for the twenty-five pairs (15.9 for the 23.2) despite the failure of 44 per cent of the nesting attempts. The percentage of loss shown by the 1929-31 data is 51 per cent, though the fourteen nests spoiled by mowing may not represent the correct proportion, as several were found only as rendered conspicuous by removal of the cover. Since the observed 51 per cent loss is not beyond comparison with the hypothetical 44 per cent of the Prairie du Sac area, nor the observed average of 13.6 young per successful nest with the hypothetical average of 15.9, we therefore have some grounds for accepting the Prairie du Sac calculations as indicative of about what happens. Discrepancies between calculations and observational data may be attributed principally to fortuitous hatching variations in the individual nest data lumped to obtain averages.

The best estimate I can make on summer losses to adult birds, based upon inferences from unsolved nest desertions and upon detached bits of data from mowing and traffic accidents and a very few predator kills, is 10 per cent or seven birds, which would leave sixty-two adult survivors for Prairie du Sac at the conclusion of nesting. Seven birds from the population would mean 2.5 breeding pairs, one of which might be lost before reproduction could be consummated. This would cut the 23.2 more or less successful pairs to 22.2.

If we now correct our calculated 15.9 chick per successful nest average to the observed 13.6 average and multiply by the above calculated 22.2 successful pairs, we get a probably more representative total of 302 chicks instead of 368. We then have for the Prairie du Sac area 302 chicks plus sixty-two adults or a population peak of 364 individuals. The fact that some broods have been suffering mortality two months or so before others hatch should not upset our reasoning.

How does a population of 364 become reduced to 184 by New Years? This brings us to a realm of tantalizing unknowns into which no one, of whom I am aware, has penetrated very deeply. True, glimpses of juvenile mortality are now and then obtained, but quan-

titative data on this phase of the bob-white's life history are almost utterly lacking. From here on we must assign increasingly arbitrary values to our factors.

Let us reduce the average size of each brood from 13.6 to ten to allow for the post-nesting juvenile losses up to the time that part-grown young are frequently seen in late summer or early fall. Broods from seven to fifteen are common (all of same size and with one or two adults—not the heterogeneous mixtures of later coveys), and an average of ten may perhaps be as logical as any. Eighty chicks would thereby be eliminated at semi-helpless stages, the victims of accident, vicissitudes of weather, and hungry creatures from which hiding ability and feeble running or flight powers might not always enable them to escape.

By September 15, we may call our population 62 old birds and 222 young of divers sizes. One hundred birds are to die in the next three and one-half months, to be apportioned largely among pot-shooting rabbit hunters in November and December, Cooper's Hawks, and to some extent among Great Horned Owls and migrating Sharp-shinned Hawks.

Losses from Prairie du Sac Great Horned Owls from October to January ran at a rather uniform rate of 1.5 per cent for the 1929-'31 quail population, so five birds might be subtracted from the doomed hundred. An allowance for partly fledged youngsters that succumb to the first October ice storm and for losses from accidents and possibly from Marsh Hawks, foxes, and other of the less efficient avian predators and those mammals which occasionally capture birds lacking resourcefulness, experience, or full physical capacity to take care of themselves might be set at fifteen, though this value is unsubstantiated by actual data.

The residual mortality of eighty birds can be attributed to the pot-hunters, Cooper's Hawks, and Sharp-shinned Hawks. I am inclined to doubt that the sharp-shins get many, for they seem to follow their own food supply (warblers, finches, etc.) southward, and I have never observed them attending quail. A loss of five may be charged to sharp-shins, for want of a better figure.

Winter observations on 473 quail for an average of seventy days disclosed a Cooper's Hawk loss that could be established at 2 per cent and a pot-hunting loss of 1.7 per cent. Both loss rates should be much higher in the fall when the young quail are more numerous and less wary, equally with respect to their native and to their human enemies. If we assume that the ratio of Cooper's Hawk kills to poaching kills is still 2:1.7 for the fall (in probability illegal shooting does far more

damage than Cooper's Hawks in the fore part of November when the opening of the rabbit hunting season draws out all sorts of irresponsibles), we can put down forty birds for the Cooper's Hawks and thirty-five for the pot-hunters. This very conveniently accounts for the remaining 75 missing bob-whites, however remote it may be from the truth.

Thus we have improvised, for a better than average Wisconsin environment a bob-white life equation, which, while it limps badly toward the end, is still an equation and as such is conceivably superior to no equation at all. It at least illustrates a method.

By this we may gain something of an idea how a thriving population ascends in one year from 73 to 184 mature birds. Apart from the direct losses occasioned through man, it is to be remarked that the annual mortality from what we call natural causes is extremely high—extremely high in terms of slow-breeding animals like man himself.

Examined more carefully, the losses take on a less formidable aspect. It is to be seen that nature is most prodigal with the lives of those in which a minimum is invested. The destruction of a dozen newly laid eggs early in the season may cost the species practically nothing. A dead day-old chick has not as much significance to the species as a dead bird that has reached breeding age, irrespective of the potentialities of the chick. Lastly, let it be made clear that a given environment, year in, year out, can support only about so many birds. When the species has filled up the tolerable environmental niches, something has to befall the surplus—unless the environment is improved to accommodate it.

If any one season in the Wisconsin bob-white's life history is supremely critical, it is winter. The complete failure of a summer's nesting need not be as disastrous to the species as a wretched winter survival. The trivial 5 per cent wintering loss given for the Prairie du Sac coveys should not be mistaken for an index as to what commonly occurs. To coveys forced by agricultural practices, emergencies, and the like, to live under adverse environmental conditions—such as prevail throughout much if not most of the Wisconsin quail range—winter means 50 per cent losses or higher, even up to annihilation (Errington 1933).

No, it is not the cold except as the cold kills the starving and those otherwise subnormal. Nor have I yet reason to believe that it is largely the snow, except as snow covers up the food supply and so promotes starvation; nor have I reason to believe it is to any extent a matter of predaceous enemies except where the birds are very much

handicapped, as by territorial deficiencies, starvation, wounds, or possibly disease. The major part of the wintering losses, according to the data at hand, can be laid to inadequacy or unavailability of high grade food or to lack of cover which prevents the birds from finding immediate refuge in case of danger (Errington 1931a, 1931b, 1933). There are many large quail-vacant spaces where some intelligently distributed fencerow brush or a few shocks of corn may mean all the difference between no coveys and perhaps two or three.

TABULAR RECAPITULATION OF THE LIFE-EQUATION OF THE WISCONSIN BOB-WHITE

on three square miles east of Prairie du Sac, January 1, 1930 to January 1, 1931.

Date	Items and Computations	Gain	Loss	Current population
Jan. 1, 1930	Census of quail in area			73
May 1 (pairing)	5% loss since New Years (based on data)		4	69
	General Wisconsin quail sex ratio is 57.7 males to 42.3 females. 42.3% of 69=29 females or 29 possible pairs. Non-breeding females (?), 15% (calculated in another area). 15% of 29 is 4, which subtracted from 29 leaves 25 pairs			
May 1-15 (first nesting attempt	General data show 57% success of nests begun at this time, an average clutch of 19.2 eggs and an average loss of 9.7% eggs through failure to hatch. 57% of 25 initial attempts give 14.3 hatchings. 14.3×19.2=275 eggs. 275 minus 27 (the 9.7%) leaves 248 living young	248		317
May 16-31	Two-thirds of the 10.7 unsuccessful pairs or 7.1 are in condition for prompt renesting (clutches were lost while incomplete). Nests begun at this time are 57% successful, average 16.6 eggs. The 9.7% of unhatched eggs may be considered constant for the summer. 57% of 7.1 attempts give 4 hatchings. 4×16.6=66 eggs. 66 minus 6 (9.7%) leaves 60 young	60		377
June 1-15	Five of the 6.7 unsuccessful pairs (on basis of some data) may be able to re-nest now. Nesting attempts are only 15.4% successful (destruction through mowing high), average 17 eggs per nest. 15.4% of 5 attempts give .8 hatchings. .8×17=14 eggs. 14 minus 2 (unhatched) leaves 12 young	12		389

Date	Items and Computations	Gain	Loss	Current population
June 16-30 July, and August	The 6 unsuccessful pairs try again during the summer. Their attempts are 68.4% successful, average 12.9 eggs. 68.4% of 6 attempts give 4.1 hatchings. 4.1×12.9=53 eggs. 53 minus 5 (9.7%) leaves 48 young	48		437
	The above calculations give 368 young for the 23.2 eventually successful nests or an average of 15.9 chicks. For this average (which is likely too high to be representative) we may substitute an average of 13.6 actually arrived at from field studies.			
	15.9 (cal. av.)×23.2 (calc. successful pairs)= 368			
	13.6 (obs. av.)×22.2 (corrected calc. successful pairs)*= 302			
	Difference due to correction 66 yg.		*66*	371
Summer	Adult losses (calc. on basis of mowing, traffic, and misc. mortality data)		7	364
	Small chick losses (almost wholly arbitrary but based on fragments of weather, predator, and misc. mortality data)		80	284
Fall	Illegal shooting (arbitrary, but based on some data)		35	249
	Mammalian and slow avian predator losses, accidents, misc. (arbitrary)		15	234
	Horned owls (well supported by data)		5	229
	Migrant sharp-shinned hawks (arbitrary)		5	224
	Cooper's hawk (arbitrary, but based on some data)		40	184
Jan. 1, 1931	Census of quail on area			184

*Loss of a pair assumed before reproduction was accomplished.

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Iowa State College,
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THE WILSON BULLETIN

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EDITORIAL

It Has Been Decided that there will be no meeting of the Wilson Ornithological Club this year. General conditions made the matter of attendance an uncertainty. Furthermore, the American Ornithologists' Union will this year hold an unusual meeting in celebration of its semi-centennial anniversary. If any of us should be able to attend only one scientific meeting this year, the A. O. U. meeting in New York city should be the one chosen. Hence for this additional reason it has been wise to skip our W. O. C. meeting this year. Except for the year 1918 our meetings have been held with regularity since the first one in 1914. It might be well to bear in mind that the American Association for the Advancement of Science meets in St. Louis in 1935, and in Indianapolis in 1937. Our meetings for 1934 and 1936 will have to be otherwise provided for.

The Eighth International Ornithological Congress will meet at Oxford, England, from Monday, July 2, to Saturday, July 7, 1934, under the presidency of Dr. E. Stresemann, of Berlin. Previous meetings have been held at irregular intervals, but the present plan is to convene the Congress quadrennially. Those who attend the Oxford meeting will have the privilege of living for the time in certain colleges of the University. Those who contemplate attending the Congress are requested to communicate with the Secretary of the Congress, Rev. F. C. R. Jourdain, Whitekirk, Southbourne, Bournemouth, England.

The University of Wisconsin announces the organization of a Chair of Game Management in its Agricultural College. The Chair has been financed for five years by the Wisconsin Alumni Research Foundation, and will be in charge of Mr. Aldo Leopold. The work will be limited to research, no undergraduate courses being contemplated.

Mr. W. M. Rosene, our Treasurer, in his business as a banker, has run across an interesting farm lease in his county. The Litchfield Realty Company, of New York, owns a large number of farms in central Iowa. Paragraph No. 11 of their standard lease contains the following text: "The owner of said land, believing it to be for the best interests of the district to encourage the propagation of prairie chickens, pheasants and quail, to that end hereby prohibits, and the tenant hereby agrees to refrain at all times from shooting or trapping of prairie chickens, pheasants and quail on the premises embraced in their lease."

GENERAL NOTES

Conducted by M. H. Swenk

Fifteen Minutes of Bird Observation in a Duck Blind in Indiana.—During the last fifteen years, I have done a considerable amount of field work in connection with bird study and as a nature guide. During the month of March, 1933, I was at the Indiana Department of Conservation Jasper-Pulaski Game Preserve, taking a wild life census of the five thousand acres of the preserve. Part of this time was spent in a corn crib which we had fixed up as a duck blind twenty feet from the duck pond, which lies in about the center of the preserve. On several occasions, Mr. Nathan Anderson, also of the Department, and I had seen a thousand ducks of three or four species on the pond at one time, but never, I believe, have I seen as many kinds as I saw on the afternoon of March 25. On the preceding night a three-inch snow had fallen, the day had been cloudy and very cold, and at 6:30 P. M. the birds were apparently hustling around to feed before nightfall. The corn crib in which we were concealed was set on posts about three feet from the ground, giving us a good observation of the grounds before us. We had cleared snow from several places on the ground and had scattered corn there, as well as on the water at the edge of the land. Within a period of fifteen minutes from 6:30 P. M. on, all within forty feet of our observation post, the following birds were seen, feeding on the ground or the edge of the water unless otherwise noted:

One hundred male Red-winged Blackbirds, chattering and calling; twenty-eight male and twelve female Cowbirds squeeking; one male Cardinal; five Meadowlarks, singing and calling (during the fifteen minute period two male Meadowlarks had a very vicious fight in front of us); six Crows, cawing and flapping their wings as they walked and fed before us; six Mourning Doves; two Bluebirds, singing as they sat on a sunflower stalk to our right; seventy-five Slate-colored Juncos; two Killdeers (one flock of eight flew over our heads, calling as they flew); twenty Tree Sparrows; six Song Sparrows, two singing; eleven Bob-whites, crooning and eating under the corn crib directly under our feet; a male and a female Marsh Hawk flying low over the marsh close by; one White-breasted Nuthatch calling as he fed on the ground; eighteen Robins, calling and singing; twelve Blue Jays, squeaking as they fed; two Downy Woodpeckers, calling as they fed on the ground; one Red-headed Woodpecker; and at the pond's edge before us the following: one Great Blue Heron; five Coots; three Baldpates; twenty-eight Mallards; thirty Ring-necked Ducks; two Red-legged Black Ducks; and two Pintails (several other flocks of ducks of various kinds were seen flying north during that time). The total seen during the fifteen minutes was 389 individuals of twenty-five species.—SIDNEY R. ESTEN, *Indianapolis, Ind.*

Some Birds of Judith Basin County, Montana.—In 1903, P. M. Silloway published "Birds of Fergus County, Montana" (Bulletin No. 1, Fergus County Free High School), an annotated list of 179 species of birds observed by him in that county, or reported from that locality by earlier workers—drawing particularly upon an early publication by J. A. Allen (Notes on the Natural History of Portions of Montana and Dakota. Proc. Boston Soc. Nat. Hist., XVII, 1874). Since that time, so far as I know, very little has been published concerning the bird life of that central section of Montana. The territory included within the boundaries of Fergus County in 1903, and covered by Silloway's list of birds,

now includes Fergus, Petroleum, and parts of Musselshell, Golden Valley, Wheatland, and Judith Basin Counties.

From July 5, 1925, until September 22, 1926, I was stationed at the Judith Basin Branch Experiment Station, two miles west of Moccasin, in Judith Basin County. During that time I became well acquainted with the birds that nested on, or visited, the Station farm, including the migrants that paused at an experimental plot of shelter belt trees and shrubs occupying an area of about two acres. A few trips into other portions of the county were made on Sundays when I was able to leave the Station.

At that time I did not publish any notes concerning the bird life of that locality. Being unable to secure a copy of Silloway's bulletin, I did not know whether any of my observations would add to the knowledge of the birds of that portion of Montana. Recently I obtained a copy of his list, and found that it did not include the following species of birds which I observed in the part of Judith Basin County formerly included in Fergus County.

American Rough-legged Hawk (*Buteo lagopus s. johannis*). A rare fall and winter visitor. Observed at the Station, December 2 and 4, 1925, and September 13, 1926. One was seen in the Little Belt Mountains southwest of Utica, September 19, 1926.

Prairie Falcon (*Falco mexicanus*). Observed as a rare permanent resident. Observed occasionally throughout the year in various parts of the county. Three birds lingered at the Station farm from May 15 to 21, 1926.

White-throated Swift (*Aeronautes saxatalis saxatalis*). Several White-throated Swifts were observed in a rocky canyon near Yogo Creek, in the Little Belt Mountains, August 2, 1925. This species probably breeds locally in the county.

Calliope Hummingbird (*Stellula calliope*). One bird of this species, evidently a migrant, visited the Station shelter belt, June 3, 1926.

Northern Hairy Woodpecker (*Dryobates villosus septentrionalis*). One bird, apparently typical of this subspecies, was seen in the Little Belt Mountains along the South Fork of the Judith River, September 19, 1926. A few days later, September 22, one was observed on a fence post in prairie country near Hobson. It was watched closely for several minutes, and its typical markings were carefully noted.

Silloway (*op. cit.*, p. 35) lists *D. v. monticola* as a common resident of the timbered country in that locality. The only previous record of the occurrence of *D. v. septentrionalis* in that part of Montana is that of a specimen taken in the Big Snowy Mountains (Anthony, *Auk*, XIII, pp. 31-34, 1896).

Olive-sided Flycatcher (*Nuttallornis mesoleucus*). Observed in the Little Belt Mountains near Yogo, August 2, 1925. This represents one of the easternmost summer records for this species in Montana. It has been previously reported from the Belt Mountains (Williams, *Bull. Nutt. Orn. Club*, VII, p. 62, 1882).

Violet-green Swallow (*Tachycineta thalassina lepida*). Two birds of this species were seen flying about the face of a high cliff in the Little Belt Mountains, near the South Fork of the Judith River, July 25, 1926.

Rough-winged Swallow (*Stelgidopteryx ruficollis serripennis*). Observed as a fairly common summer resident along the Judith River throughout its course in the prairie portion of the county .

Wilson's Warbler (*Wilsonia pusilla pusilla*). A few Wilson's Warblers visited the Station shelter belt during their fall migration in 1926. The first ones were recorded August 19, when about twenty stopped at the shelter belt. Thereafter a few birds were seen frequently until September 17 (I left the locality September 22). About fifty individuals, all females except one, were observed September 13.

Northern Pileolated Warbler (*Wilsonia pusilla pileolata*). Birds of this subspecies also visited the shelter belt during their fall migrations, but in much smaller numbers than those of the preceding subspecies. Observed September 5, 7, and 8, 1925; a female and a male seen August 20, were the only ones observed during 1926.

Cassin's Purple Finch (*Carpodacus cassini*). A male Cassin's Purple Finch visited the Station shelter belt, May 12, 1926, singing several times soon after sunrise.

Pale Goldfinch (*Spinus tristis pallidus*). Silloway (*op. cit.*, p. 51) lists *S. t. tristis* as the form of this species occurring in Fergus County. So far as I could determine, from close observation, the breeding form at Moccasin was *S. t. pallidus*, and *tristis* occurred as a late summer and fall visitor. Possibly intergradation occurs in that locality. (See Saunders, Pac. Coast Avifauna No. 14, p. 112, 1921). In 1926, five pairs of Goldfinches which I believe to have been *pallidus* nested in the Station shelter belt. The species was first recorded that spring on May 24.

Northern Sage Sparrow (*Amphispiza nevadensis nevadensis*). Six birds of this species visited the Station shelter belt, August 19, 1926, probably in migration. Three were seen there the following day. Previous records of this species in Montana appear to be restricted to Gallatin and Park Counties (Saunders, *op. cit.*, p. 128).

Slate-colored Junco (*Junco hyemalis hyemalis*). Observed as a regular migrant at the Station. Latest date in 1925, September 22. Observed April 25, May 14, and from September 13 to 19, 1926.

On July 25, 1926, at an altitude of about 6500 feet in the Little Belt Mountains near the South Fork of the Judith River, I observed three broods of young Slate-colored Juncos on the wing with adults. There appears to be only one published record of the breeding of this species in Montana (Thorne, *Auk*, XII, p. 217, 1895), and Saunders (*op. cit.*, p. 125) suggests that this record may be inaccurate.

White-crowned Sparrow (*Zonotrichia leucophrys leucophrys*). Six migrant birds of this species were observed in the Station shelter belt, September 13, 1926.

Slate-colored Fox Sparrow (*Passerella iliaca schistacea*). Several Slate-colored Fox Sparrows were observed along the Judith River southwest of Utica, July 25, 1926.—Winton Weydemeyer, *Fortine, Mont.*

Bird Life Along the Kankakee.—During the spring of 1930, it was my privilege to spend several weeks along the Kankakee River in the northeastern part of Illinois, collecting and observing birds. Arrangements had been made some time before to rent a cabin from the owner of one of the numerous summer resorts which are to be found along both banks of this river, and which are well patronized during the summer months. We had made our plans to get there during the height of the migration period, but did not arrive until nearly a week after it was in full swing.

The main purpose of this trip was to get as many different species of North American warblers as possible, to be used for the systematic series, and also other birds which were needed for the same purpose. Sixty different species of birds were seen, of which forty-five species were taken. Most of the birds seen were just passing through on their way to northern breeding grounds, but quite a few remained in this locality to breed.

The first week after our arrival one could not help noticing the great numbers of Tennessee Warblers (*Vermivora peregrina*) that were about. The woods were full of them and I believe it safe to say that one saw three Tennessee Warblers to one of any other kind of bird. This was between the dates of May 8 and 15. The second week, or between the dates of May 15 and 22, the Tennessee Warblers were leaving and their places were taken by the Chestnut-sided Warblers (*Dendroica pensylvanica*) in as great numbers. I do not believe after the beginning of the second week, that is, about May 22, that more than one or two Tennessee Warblers were seen. These two species were the most numerous of the warblers observed in this locality.

One evening as we were returning to our cabin from up the river, quite a number of Rough-winged Swallows (*Stelgidopteryx serripennis*) were seen flying about near the middle of the river, as we were returning in a boat with the current. We let the boat drift slowly down stream, and succeeded in getting a few good specimens, shooting them as they swooped down to the surface of the water in search of food. These birds were quite a welcome addition to our collection, as they were the only ones seen during our stay.

Of the most numerous birds seen in this locality at that time of the year (May), I believe the Catbirds (*Dumetella carolinensis*) will come first. They were in so great numbers that one not only saw one at a time, but two and on numerous occasions, three and four. The Towhees (*Pipilo erythrophthalmus*) were also abundant, hopping around on the ground or perched on low bushes in search of food. There were also many thrushes, with the Gray-cheeked (*Hylocichla minima aliciae*) and Olive-backed (*Hylocichla ustulata swainsoni*) heading the list. I might also mention the Redstarts (*Setophaga ruticilla*), as quite a number of these birds were seen every day, flashing by from tree to tree as one walked through the woods.

One morning as we were going through a large pasture field in which a small herd of cattle were grazing, both the Eastern Meadowlark (*Sturnella magna magna*) and Western Meadowlark (*Sturnella neglecta*) were heard singing. These birds were both in the same field and only about two or three hundred yards apart. We watched one of them through our glasses, singing away perched upon a tuft of dried grass; later, one of each species was taken not far from there.

Quite an unusual story was told to us by the people living in the farmhouse near our cabin, of a Prothonotary Warbler (*Protonotaria citrea*) that had built its nest for three consecutive years in the pocket of an old hunting coat that was left hanging in their garage, which was only about twenty-five feet away from the house. The bird hatched out a brood of from four to six young each year, even though the garage was used continuously by the people in running their car in and out. Each fall at the opening of the hunting season, the farmer would take the coat off the hook, clean out the nest, which was made of dried grasses, use it during the season and then hang it back on the same hook, and the next year the bird would be back again and set to work to build a nest in the pocket and to raise another brood.

This year while we were there, what was believed to be the same bird started to build its nest in the spout of the pump which was standing alongside the house, and where the drinking water was obtained, making it necessary to tie a cloth over the spout so that it would not clog. This did not discourage the bird though, as she soon found another place—in an empty flowerpot which was left standing on the sill of the basement window of the house. She had just finished building when we were ready to leave and upon examining the nest it was found to be made entirely of dried moss.

Quite a few nests of the Prothonotary Warbler were found along the banks of the river, most of them in hollow trees, either leaning out over the water or not far back from the river's edge.

It was on this trip that the peculiarly marked specimen of Rose-breasted Grosbeak (*Hedymeles ludoviciana*) was collected which was described in the *Auk*, XLVII, No. 4, October, 1930. The under-wing coverts of this specimen, which was a female, were rose-pink instead of saffron, this being the normal color for the female, while rose-pink predominates in the males. I have come across only two other cases like this. This specimen was taken on May 16, from a large sycamore tree growing about seventy-five feet from the river's edge.

During our short stay, quite a few interesting observations were made of the nesting habits of the Woodcock (*Philohela minor*). On a small section of ground, approximately one square acre, along one side of which the Kankakee River flowed, and surrounded on the other three sides by heavy woods and second growth thickets, one could always flush from fifteen to twenty birds each time he walked through this particular spot. This small area of ground was thickly covered with brush and other under-growth, and from the number of birds seen and the nests that were found, it was estimated that between ten and twenty birds were nesting there.

On May 17, a nest with four eggs was found, after flushing the bird. We watched every day very closely for the eggs to hatch, but had to bring our stay to a close before the young came out of their shells. On May 19, another nest which contained only one egg was found, also after flushing the bird. We went back the next day, but did not see the bird nor was there another egg in the nest. But on the third day, when we returned again, the nest was found to contain two eggs. But the bird had left before we arrived, so did not get to see her this time either. These two nests were about 150 yards apart, both built right on the ground, of small sticks with a very little dried grass woven in amongst the sticks. While the bird was incubating her eggs, and also when she left the nest, the grass that was growing around was pulled down and over to conceal her and the eggs, so that one would have to look very closely to find out if she was on the nest or not. I noticed that each time a bird was flushed it went about the same distance and direction before alighting, even though we came upon it from different directions just to see what it would do, but each time it would swing around us before settling down again. Could we have arranged to stay longer I am sure that many more interesting observations could have been made of these well-known and delightful birds, which furnish real sport to the hunter in the fall of the year.

It was certainly surprising to find the number of species of birds that we did, so close to the second largest city in the United States, as we were only sixty or sixty-five miles from Chicago's "loop".—John William Moyer, *Field Museum of Natural History, Chicago, Ill.*

A Statistical Study of Ohio Raptorial Birds.—The writer for many years has been interested in the relative abundance and the fluctuation in numbers of the two vultures, the ten owls, and the fifteen hawks known to have occurred in Ohio. During the years 1918 to 1931, inclusive, a careful record has been kept of the exact numbers recorded of each species on all field trips taken. During this period 1,575 whole or part days have been spent in the field, totaling 12,694 hours of observations, 8,071 miles covered on foot and more than 96,000 miles by auto transportation. Every township in the state has been visited and some work has been done in each county of the state during each of the last five years, so the observations have been fairly evenly divided among all sections of the state. A summary of the total numbers of each species enumerated during the fourteen years is as follows:

Turkey Vulture (*Cathartes aura septentrionalis*)	15,745
Eastern Sparrow Hawk (*Falco sparverius sparverius*)	3,841
Marsh Hawk (*Circus hudsonius*)	1,284
Eastern Screech Owl (*Otus asio naevius*)	651
Eastern Red-tailed Hawk (*Buteo borealis borealis*)	538
Cooper's Hawk (*Accipiter cooperi*)	442
Barn Owl (*Tyto alba pratincola*)	301
Northern Red-shouldered Hawk (*Buteo lineatus lineatus*)	263
Great Horned Owl(*Bubo virginianus virginianus*)	236
Sharp-shinned Hawk (*Accipiter velox velox*)	127
Black Vulture (*Coragyps atratus atratus*)	111
Northern Barred Owl (*Strix varia varia*)	70
Short-eared Owl (*Asio flammeus flammeus*)	69
Northern Bald Eagle (*Haliaeetus leucocephalus leucocephalus*)	37
Osprey (*Pandion haliaetus carolinensis*)	37
Eastern Pigeon Hawk (*Falco columbarius columbarius*)	33
American Rough-legged Hawk (*Buteo lagopus s. johannis*)	26
Eastern Goshawk (*Astur atricapillus atricapillus*)	15
Saw-whet Owl (*Cryptoglaux acadica acadica*)	14
Long-eared Owl (*Asio wilsonianus*)	14
Broad-winged Hawk (*Buteo platypterus platypterus*)	11
Snowy Owl (*Nyctea nyctea*)	8
Duck Hawk (*Falco peregrinus anatum*)	5

The total number of raptorials observed in the fourteen years was 23,876. The count by years was: 1918, 697; 1919, 1142; 1920, 923; 1921, 1679; 1922, 1273; 1923, 1648; 1924, 1352; 1925, 2237; 1926, 1315; 1927, 1698; 1928, 2244; 1929, 3434; 1930, 2266; and 1931, 2207. This represents an average of about fifteen raptorials for each day spent in the field, two per hour in the field and three to each mile on foot. The vultures totaled 15,856 individuals, or ten birds per field trip; the hawk group totals 6,654 individuals, or 4.2 birds per field trip; and the owls total 1366 individuals or an average of .9 birds per day in the field. In comparing numbers of field counts of various species, the general habits of the species and its conspicuousness and ease of identification should be taken into consideration. Owls are always much more abundant than the number actually observed would seem to indicate, due to their nocturnal habits and secretiveness. The figures would seem to indicate that hawks were about five times as common as the owls and that the Sparrow Hawk was about six times as common as the Screech Owl, while actually the two species are believed to be of about equal abundance over a large portion of the state.—Lawrence E. Hicks, *Ohio State University, Columbus, Ohio.*

The Cedar Waxwing Breeding at Nashville, Tennessee.—In the WILSON BULLETIN of September, 1924, page 138, the writer reported a number of June and July occurrences of the Cedar Waxwing (*Bombycilla cedrorum*) at Nashville, Tennessee. Since that time a number of additional summer records have been obtained, together with one instance of the breeding of the species.

On June 9, 1928, a single waxwing was found in a boxelder just west of the Parthenon in Centennial Park. This seemed strange, since late migrants frequent mulberry trees only. On the 16th, two birds were discovered in the same tree. A few minutes' observation was rewarded by seeing one of the birds go to the neighboring tree and settle upon a nest.

This nest was placed about fifteen feet up, near the end of a long limb, in a small, diseased boxelder. It was viewed only from the ground, and details of its construction, as well as the number and date of laying of the eggs, remain unknown. Apparently some of the eggs had been deposited when the nest was found. It was visited daily, and the birds watched briefly. On July 3, the heads of the young were first noted above the nest rim. On the 12th, they still seemed small, yet had evidently left the nest on the 15th, although they could not then be found. On the 17th they were located in the next tree along the drive, where their parents were caring for them. These birds were very recently out of the nest; their tail feathers were very short, showing only the yellow tips. Search of the whole neighborhood on succeeding days failed to locate the family and no more waxwings were seen until the fall migration.

The adult waxwings ranged widely over the one hundred acre park during the whole nesting period. They invariably flew long distances on leaving the nest, and were often observed at points several hundred yards from their home. This is exactly like the behavior of the birds observed in this same locality in 1924. In fact, the writer feels certain that the waxwings he recorded in June and July, 1924, nested somewhere on the eastern slope of Centennial Park hill.

Since this nest was found a special effort has been made to learn if the species is beginning to establish itself in this region, but with negative results. A lone waxwing flew over my home on the afternoon of August 4, 1929. What looked like a promising record was made on June 21, 1930, when two birds were found at Radnor Lake. An orchard and rows of trees growing along fence lines seemed to offer suitable nesting sites, but the birds were never seen again. This completes the record up to July 15, 1933.—HARRY C. MONK, *Nashville, Tenn.*

Too Much Red?—While walking near a tract of fine young oak woodland, on May 18, 1933, I heard at some distance a Scotch version of the song of the Rose-breasted Grosbeak, with a few measures of the Robin's song added. This was interesting, indeed. I advanced very cautiously in the direction from whence the music came. Soon I arrived in sight of the singer, a fine specimen of the Scarlet Tanager. I had just placed myself in a position to observe his beautiful colors and enjoy his song, when suddenly a male Cardinal darted down upon him, brushing first one side and then the other, harassing and tormenting the tanager quite noticeably. The latter adroitly dodged the Cardinal several times, but evidently his disposition as well as his feathers became ruffled, and he started off at high speed over the cultivated fields to the northwest. I watched the reddish glint of his plumage in the bright sunlight through my glasses until he faded from view. It is two miles in that direction to the nearest tract of forest. The tanager

had evidently decided to put enough space between himself and the Cardinal to make renewed conflict between the red and the scarlet impossible. Neither Mrs. Tanager nor Mrs. Cardinal were seen, but the fierce attack of the Cardinal would indicate that his lady probably was warming three or four eggs in a snug nest near by, and according to my observations Mrs. Tanager does not migrate to the north until her brilliantly attired spouse has gone on several days ahead.—E. D. NAUMAN, *Sigourney, Iowa.*

Notes on Rare Birds in Indiana.—A Snowy Owl (*Nyctea nyctea*) was brought to my home for identification last winter, it having been shot and crippled while sitting in a tree along the street. It was a beautiful specimen, and I made arrangements for the man, who was a stranger, to place it in a window of a bank for others to see, giving him a cage in which to display it. But it did not appear in the window, and I afterwards discovered that the man sold it to someone (he said) for eighteen dollars. But I never saw the cage again!

We found a flock of about fifty Golden Plovers (*Pluvialis dominica dominica*) twenty-six miles north of this place May 4, 1929, in a flooded area near the road, after a heavy rain. The birds were very tame, and were feeding and resting in the shallow water. They did not fly as we stopped to observe them with high power binoculars from the auto. I have never seen them in this vicinity on any other occasion.

I found the Blue Grosbeak (*Guiraca caerulea caerulea*) near here in 1930, a beautiful male which flew down on the ground about ten feet in front of me in the bright May sunshine, giving me a perfect view of him. Not long before this I had seen a pair of these rare birds when out with a class of students and their teachers near Earlham College. In May of this year (1931) I found another Blue Grosbeak in the forest preserve near Oak Park, Ill., and had a good view of him, a young male in changing plumage.

Many American Egrets (*Herodias albus egretta*) and Little Blue Herons (*Florida caerulea caerulea*) from the South were in this part of the country last summer (1930) for several weeks, fishing along streams. Many were killed by boys and men. We have several Great Blue Heron colonies, and also colonies of the Black-crowned Night Heron within a few miles of Anderson. Farmers are driving them out and shooting them.—MRS. HORACE P. COOK, *Anderson, Ind.*

The Song of the Female Orchard Oriole.—Alden H. Miller in the WILSON BULLETIN for June, 1931, gives an account of the song of the female Bullock's Oriole (*Icterus bullocki*). The writer would like to follow up that article with a note on the song of the female Orchard Oriole (*Icterus spurius*). On May 31, 1932, while working with Fred M. Dille in Cherry County, Nebraska, I heard what sounded like a shortened song of the Orchard Oriole. The bird was soon found and the lack of black on the throat was as puzzling as the song was when it was first heard. The bird was observed for a long time and gave a song about two-thirds the length of the average Orchard Oriole song. It was obviously not an immature male bird and dissection proved it to be a female.—WILLIAM YOUNGWORTH, *Sioux City, Iowa.*

New Records for Bowling Green, Kentucky.—The long-continued rainy season in the spring of 1933 caused another large transient lake on the McElroy farm, ten miles south of Bowling Green (see "Bird Life of a Transient Lake in Kentucky", WILSON BULLETIN, XLI, pp. 177-185, September, 1929). Of the thirty-one species of water and wading birds seen from March 17 to May 26, the following five are new records for this area:

Blue Goose (*Chen caerulescens*). Two adults and one immature bird of this species appeared on the farm on the night of March 13, when a tornado visited Nashville, fifty-six miles away. Another adult and another immature one joined these on March 20. The five remained on the farm until about April 13, according to the managers of the estate. I saw the three on March 17 and 18 and the five on March 24 and 31 (see "The Blue Goose in Kentucky", WILSON BULLETIN, XLV, p. 83, June, 1933).

Florida Gallinule (*Gallinula chloropus cachinnans*). One recorded on May 11 and another on May 21. The only other record of this species that I have is questionable.

Black-Bellied Plover (*Squatarola squatarola*). Five recorded around the last remnants of the lake on May 11. They were very noisy and active.

Piping Plover (*Aegialitis meloda*). Several dozen found in company with Semipalmated Plovers and numerous species of sandpipers on May 21.

Wilson's Phalarope (*Steganopus tricolor*). Two females seen on May 11 in company with Semipalmated and Least Sandpipers.

Other species recorded that were new for the farm, but not for my territory, were the American Woodcock (*Philohela minor*) on May 2, and the American Egret (*Casmerodius albus egretta*) on April 27 and 29.

Since the publication of my former study I have also added the following species not mentioned already in these notes: Green-winged Teal (*Nettion carolinense*) on April 3, 1932; Shoveller (*Spatula clypeata*) on April 3, 1932; April 29 and May 2, 1933; and Lesser Scaup Duck (*Nyroca affinis*) on April 3, 1932; March 31 and April 29, 1933. All told, in the twenty-one years that I have studied the transient lake on this farm, I have recorded forty-two species of water and wading birds.—GORDON WILSON, *Bowling Green, Ky.*

Brewer's Blackbirds in Waukesha County, Wisconsin.—Brewer's Blackbird (*Euphagus cyanocephalus*) was first observed in Waukesha County, Wisconsin, by S. Paul Jones and the writer on May 28, 1933. A small colony of ten pairs have established themselves on a savannah seven miles southwest of Waukesha. We found a nest with four eggs on May 30, but were unable to locate any others. This nest subsequently was destroyed. By June 18, all young birds were apparently out of the nests but were still in the vicinity and being fed by the parents. Later, while working on an ecological survey of a large area of wet prairie south of Waukesha, on June 3, 1933, C. P. Gale and I encountered a second colony of about eight pairs. No nests were found, but young birds were seen on June 18. Both localities are similar—being mainly a *Carex* association, with scattered shrubs of *Potentilla fructicosa*. On several occasions I noticed small flocks walking along the freshly-turned earth behind a farmer's plow. In their search for food they often came within six feet of him. This is the first record of Brewer's Blackbird in the county, and one of very few for the state.—J. T. CURTIS, *Carroll College, Waukesha, Wis.*

The Mockingbird in Wisconsin.—On December 14, 1932, a Mockingbird appeared at my home at 2222 Van Hise Avenue, Madison. I immediately notified Messrs. John S. Main and A. W. Schorger, who verified the identification. When first seen the bird was feeding on the berries of a heavily-fruited bittersweet vine trained upon an elm tree pruned for the purpose of encouraging the vine. For the succeeding two months the Mockingbird visited this vine daily. The berries of Japanese love-vine also seemed to be eaten to some extent, but a heavily-laden mountain ash tree near by was apparently ignored as a source of food. So also was a chunk of suet maintained on the trunk of the elm, and a feeding platform supplied with corn and a mixture of ragweed and foxtail seed gathered the preceding fall from under a silage-cutter.

The weather throughout January was mild. On February 8, however, a severe blizzard set in. Snow, wind, and sub-zero temperatures prevailed for a week. The Mockingbird appeared the first day of the blizzard, but never again.

Will a straight diet of wild fruit, however abundant, sustain a bird in severe weather? The ornithological literature would seem to assume that wild fruit has material sustenance value for all birds which eat it. Paul L. Errington ("Quail Winter Food and Cover", *American Game*, pp. 7-8, November-December, 1931), however, has now disproved this assumption for Bob-Whites. Possibly this assumption should be re-examined, species by species, since there is no warrant for assuming that their respective digestive powers or physiological needs are all alike.—Aldo Leopold, *Madison, Wis.*

Boldness of Barred Owls when Danger Threatens Young.—I had known for quite a while that a pair of Northern Barred Owls (*Strix varia varia*) had a nest in the woods across the big bottom from my place, for they always acted peculiarly when I happened to be in that vicinity, and every time I neared a certain part of the woods they, both male and female, gave vent to odd noises, a sort of a chortling cry, notes that I had never heard them make before. On May 4, 1932, I chanced to be in that locality and, as usual, the big birds showed themselves almost immediately; they followed me closely, and their cries, more odd than usual, had a note of viciousness in them. I had little time to look for a nest and did not attempt to do so, but you may guess that I was surprised when I happened upon a young Barred Owl sitting at the base of a red oak tree. The parent birds apparently knew the moment I spied him that he had been discovered, for they came still nearer, alighting in the trees very near me, hooting, and snapping their bills.

The young one could not fly well, though if given a start or if starting from an elevation he could fly a short distance. I carried him part way to the houses, the adults still following, hooting, and snapping their bills as before. After a bit I tossed the young one into the air and he sailed back about half way across the bottom where he alighted on a small red elm. One of the adults followed him closely while the other, perched in a beech not more than thirty feet away, kept its yellow eyes glued upon me until I quitted the vicinity.—Grant Henderson, *Greensburg, Ind.*

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